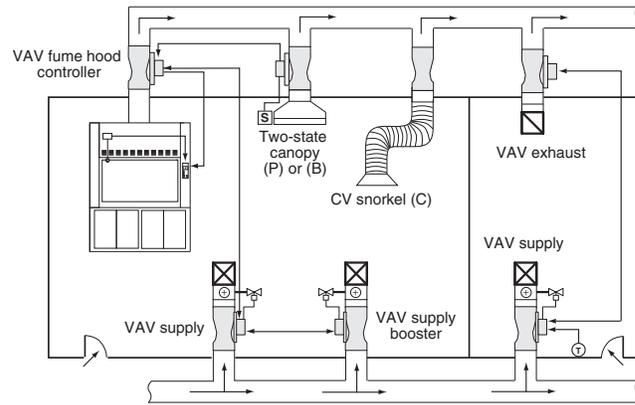


Variable air volume (VAV) control schemes are commonly used for fume hoods, general exhaust, and room supply air. For typical fume hood applications, high-speed (< 1 second speed of response) actuation is required. The Celeris® valve controller interfaces with our current fume hood monitors for control and monitoring. Celeris controllers also provide room-level control functions in either standalone or integrated systems.

For Tracking Pair control (non-VAV applications where make-up air control and an interface with the fume hood monitors are not required) Celeris controllers with low-speed electric actuation offers an economical solution for room-level ventilation, pressurization, temperature and humidity control in either standalone or integrated systems.



## FEATURES

FEATURE/OPTION	VAV (EXV/MAV)		
	L	N	M
Control type	L	N	M
Actuator type	Low-speed electric	Pneumatic*	High-speed electric
Flow feedback signal	✓	✓	✓
Failsafe	Last Position	NO/NC	NO/NC/Last Position
Factory-insulated valve body (supply)	✓	✓	✓
Field-adjustable flow	✓	✓	✓
Flow alarm via feedback circuit	✓	✓	✓
Flow alarm via pressure switch	Option	Option	✓
Low noise diffuser construction†	✓	✓	✓

All valves include a pressure-independent assembly and factory-calibrated position controller.

†Accel II valves are designed to reduce sound over all frequencies, but significantly target the lower bands (125-500 Hz) to help eliminate the need for silencers.

\*The pneumatic actuator is not available for the 14-inch valve at this time.

### OSHPD Certified

This device is certified for OSHPD Seismic Certification Preapproval per 2013 CBC, 2012 IBC, ASCE 7-10, and IEC-ES-AC-156. OSHPD Special Certification number OSP-0290-10.

### NVLAP Accreditation

All venturi valves are characterized on NVLAP Accredited Airstations, Lab Code 200992-0. NVLAP is administered by the National Institute of Standards and Technology (NIST).

### ISO

Phoenix Controls Designs, Develops, Manufactures, and sells products, systems, and service to control the environment and airflow of critical spaces. Phoenix Controls is registered to ISO 9001:2008.

### Warranty

Phoenix Controls Warrants all venturi valves against defects in material and workmanship for a period of 5 years. In addition, all other equipment manufactured by Phoenix Controls, such as sash sensors, fume hood monitors, and equipment supplied but not manufactured by Phoenix Controls is covered by a 3 year warranty.

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# SPECIFICATIONS

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## Construction

- 16 ga. spun aluminum valve body with continuous welded seam
- Valve bodies available as uncoated aluminum (Class A) with corrosion-resistant baked phenolic (Class B and C) or with PVDF coatings for more chemical intense applications (Class D)
- Composite Teflon® shaft bearings
- Spring grade stainless steel spring and polyester or PPS slider assembly
- Supply valves\* insulated with 3/8" (9.5 mm) flexible closed-cell polymer-based foam. Flame/smoke rating 25/50. Density is 1.5 lb/ft<sup>3</sup> (24.0 kg/m<sup>3</sup>)

## Operating Range

- 32-122 °F (0-50 °C) ambient
- 10-90% non-condensing RH

## Performance

- Pressure independent over 0.6"-3.0" WC (150-750 Pa) drop across valve
- Volume control accurate to ±5% of airflow command signal
- No additional straight duct runs needed before or after valve
- Available in flows from 35-10,000 CFM (60-16,990 m<sup>3</sup>/hr)
- Response time to change in command signal:
  - <1 second (control type M and N)
  - <1 minute (control type L)
- Response time to change in duct static pressure: <1 second

## Pneumatic Actuation

(Not available with the 14-inch valve)

- 20 psi (-0/+2 psi) with a 20 micron filter main air required
- Compressor sizing: Accel II Valves are not continuous air-consuming devices. For compressor sizing, use:
  - single and dual valves: 10 scim
  - triple and quad valves: 20 scim

## Sound

Designed for low sound power levels to meet or exceed ASHRAE noise guidelines.

## Power

24 Vac (±15%) @ 50/60 Hz

## Power Consumption

Singles/Duals *per valve*

- Low-speed Electric: 10 VA
- High-speed Electric: 70 VA
- Pneumatic: 10 VA

Notes:

1. All power consumption VA ratings listed here are based on fully-loaded I/O.

## I/O

Available for connecting field devices:

- 3 universal inputs. Accepts volt, mA, ohms or NTC 2 or 3 thermistor signals.
- 1 digital input
- 2 analog outputs. Provides volt or mA signals.
- 1 digital output (Type C, 1 amp @ 24 Vac/Vdc)
- Input accuracy: Voltage, current, resistance: ±1% full scale
- Output accuracy
  - 0 to 10 Vdc: ±1% full scale into 10 kΩ minimum
  - 4 to 20 mA: ±1% full scale into 500 Ω +0/-50 Ω

## Agency Compliance

- CSA
- CE
- FCC

Room-level communications: FTT-10, 78 KB, bus topology, LonTalk™ network

Building-level communications: TP-1250, 1.2 MB, bus topology, LonTalk™ network



See wiring diagrams

## FCC Compliance Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

\* Not applicable to CVV series.

Teflon is a registered trademark of DuPont Company.

LonWorks is a registered trademark of Echelon Corporation.

# ORDERING GUIDE

## MAV A 1 12 M - A M E H O - SFB REI

### VALVE FAMILY

EXV = Celeris exhaust valve  
 MAV = Celeris supply valve (comes standard with insulation)

### VALVE CONSTRUCTION

A = Body and cone uncoated aluminum; uncoated 316 stainless steel shaft  
 B = Body and cone with baked-on phenolic coating; PFA-coated 316 stainless steel shaft  
 C = Body and cone with baked-on phenolic coating; hardware with titanium or baked-on epoxy phenolic coating; PFA-coated 316 stainless steel shaft  
 D = Body and cone with PVDF coating; hardware with PVDF or baked-on epoxy phenolic coating; PFA-coated 316 stainless steel shaft; *see Note 1*

### NUMBER OF VALVE BODIES

F = Single valve body with welded circular flange  
 1 = One valve body no flange  
 2 = Two valve bodies as one unit (dual); 10", 12", and 14" valves only

### VALVE SIZE

08 = 8" valve (7.88"/200 mm actual diameter),  
 10 = 10" valve (9.67"/246 mm actual diameter)  
 12 = 12" valve (11.84"/301 mm actual diameter)  
 14 = 14" valve (13.88"/353mm actual diameter)

### FLOW/PRESSURE OPERATING RANGE

See *Flow/Pressure Operating Range* table below.

M = Medium pressure operation; pressure independent over a range of 0.6 to 3.0" WC (150 to 750 Pa), associated pressure switch trips at 0.3" WC

### VALVE DESIGN

A = Conical-shaped diffuser (Accel II)

### VALVE OPTIONS

EVI = Exhaust valve with insulation blocks and insulation  
 IBO = Insulation blocks only, no insulation  
 PSL = Pressure switch, low limit  
 REI = Remote electronics - indoor applications only; *see Note 3*  
 REO = Remote electronics - outdoor applications only, for pneumatic actuation only; *see Note 4*  
 WRE = Weather resistant electronics - outdoor applications, for electric actuation only; *see Note 5*  
 SFB = Square flanges on both ends of single-body valves; *see Note 1*  
 SFX = Single square flange mounted on either the exhaust inlet or supply discharge; *see Note 1*

### FAIL-SAFE POSITION

C = Normally closed  
 O = Normally opened  
 Z = Fails to last position

### VALVE ORIENTATION

H = Horizontal  
 U = Vertical upflow  
 D = Vertical downflow

### VALVE CONTROLLER DESIGNATION

E = Electronic controller  
 H = Hood exhaust valve with pressure switch; *see Note 2*

### CONTROL TYPE

I = IP54 low-speed electric;  
*only available on single-body valves in sizes 08, 10, 12*  
 L = Low-speed electric  
 M = High-speed electric  
 N = Pneumatic

FLOW/PRESSURE OPERATING RANGE FOR STANDARD VALVE DESIGNS

Designation	Size	Operating Range in CFM (m3/hr)		Pressure Drop Across Valve
		Single	Dual	
M = Medium Pressure	08"	35-700 (60-1185)	—	0.6-3.0" WC (150-750 Pa)
	10"	50-1000 (85-1695)	100-2000 (170-3390)	
	12"	90-1500 (155-2545)	180-3000 (310-5090)	
	14"	200-2500 (340-4245)	400-5000 (680-8490)	

### NOTES:

- Construction D is ONLY available in single-body valves (Number of Bodies = F or 1) WITHOUT square flanges (Options SFB or SFX). Rectangular plates can be purchased as special products to field assemble two, three or four single-body round-flanged valves into multi-body configurations. For sizes 08, 10, and 12 only.
- Celeris Hood valves cannot have Low Speed actuators (Control Type = L or I).
- Option REI: Remote Electronics, Indoor installations ONLY. The distance to the valve controller is limited to:
  - 75 feet (22.8 meters) of pneumatic tubing for pneumatic actuators (Control Type = N).
  - 40 inches (1 meter) of 18 gauge cable for high-speed electric actuators (Control Type = M).
  - 150 feet (45.7 meters) of 22 gauge cable for low-speed electric actuators (Control Type = L or I).
- Option REO: Remote Electronics, Outdoor installations ONLY. Limited to PNEUMATICALLY actuated valves ONLY (Control Type = N). HORIZONTAL orientation ONLY.
  - Includes sealed Vpot, small weather-resistant NEMA 3R box mounted on base channel for others to connect Vpot cables, and a valve controller in an enclosure that has been disconnected from the base channel and shipped in the same box as the valve.
  - Maximum distance between remote mounted enclosure and valve is 75 feet (22.8 meters) (maximum allowable length of pneumatic tubing).
  - REQUIRES use of a dog house enclosure, provided by others, to protect valve from the elements and maintain temperature and humidity conditions within Phoenix specifications.
- Option WRE: Weather Resistant Electronics, outdoor installations. Applies to ELECTRICALLY actuated valves with sufficient IP ratings only: Control = I or M for single-body valves; Control = L or M for multi-body valves. HORIZONTAL orientation ONLY.
  - Includes: sealed Vpot and large weather-resistant IP66 box mounted on base channel that houses the controller and all electric connections to/from it.
  - When used in Low-Speed Electric applications for 08-, 10-, and 12-inch single-body valves, WRE must ALSO be ordered with Control Type I in place of the standard Control Type L.
  - When used in High-Speed Electric applications, standard actuators are sufficient (Control Type = M) since they are IP56 actuators.
  - REQUIRES use of a dog house enclosure, provided by others, to protect valve from the elements and maintain temperature and humidity conditions within Phoenix's specifications.

## VALVE CONTROLLERS AND OPTIONS

### Valve Controller Designation

**Controller Type E**—Suitable for supply, make-up air and general exhaust valve applications.

**Controller Type H**—Suitable for fume hood applications and includes a pressure switch for alarming.

**Valve Options** (*components added to enhance a valve's functions*)

**Single square flange (SFX)**—Provides a single connection from a round single body valve to a square duct (on the inlet of single body exhaust valves; discharge of single body supply valves). Typically used in Neutralizer™ applications.

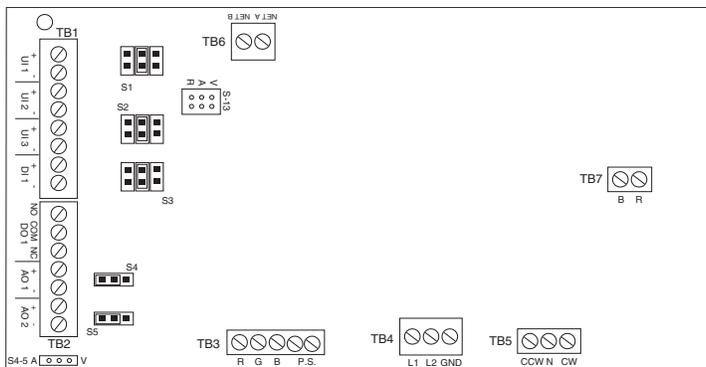
**Two square flanges (SFB)**—Transitions each end of a single body valve from a round to square duct.

**Pressure switch (PSL)**—Detects low static pressure across the valve. Installed on non-hood exhaust valves to provide low static pressure alarm monitoring.

## POINTS AND WIRING

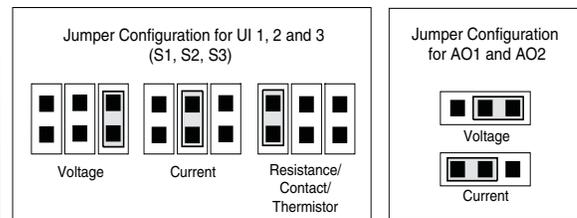
### Celeris Valve Controller

NOTE: See submittal wiring diagram for project-specific details.



#### NOTES:

1. Power—14 AWG (Controller Type M).  
High-speed electric valves must be connected in a star configuration.
2. Power—18 AWG (Controller Type L).
3. Control signal—22 AWG multi conductor, twisted pair
4. Communication—22 AWG level 4; 16 AWG Belden 8471 (or equivalent)
5. Each termination block (except TB3, 5 and 7) uses a depluggable connector with screw-down terminations for ease of installation.

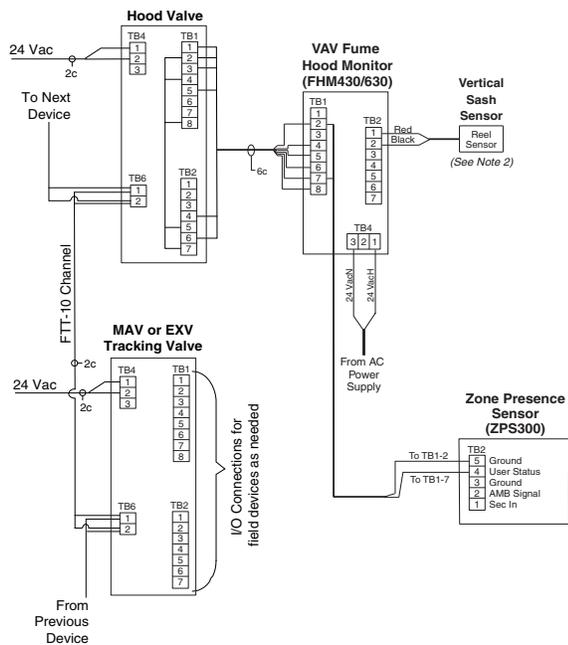


#### TERMINAL BLOCKS—CELERIS VALVE CONTROLLERS

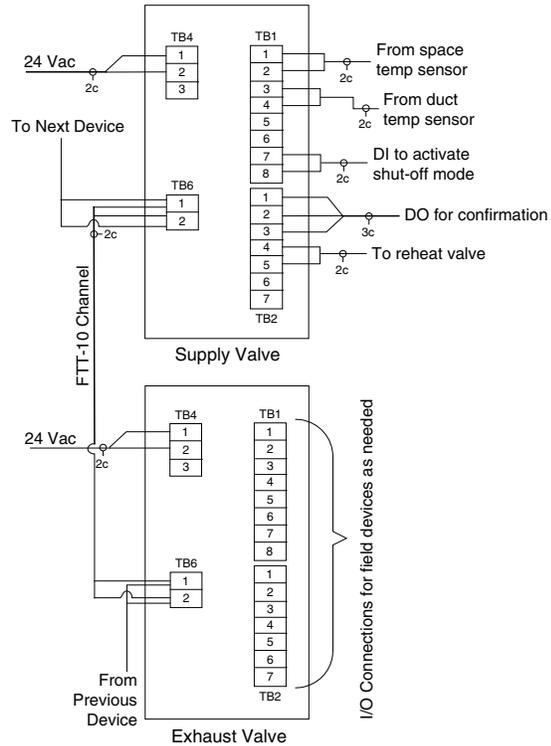
Terminal Block	Typical Function	Number of Terminations
TB1	Input connections	8
TB2	Output connections	7
TB3	vPot and pressure switch	5
TB4	Power (24 Vac input)	2
TB5	Actuator (control type L only)	2
TB6	Communication (FTT-10)	2
TB7	Actuator (control type M only)	2

## Typical Wiring Diagrams

### Hood Applications



### Tracking Pair Applications



#### NOTES:

1. Eight-conductor wire is Belden 9421 (22 AWG) or equivalent. (Tape back unused conductors.)
2. Sash sensor is provided with two-conductor cable. See combination sash sensors for exception.

## Network Wiring

### Room-Level Network

Echelon Corporation has tested and approved 5 cables types for use with the FTT10 communications transceiver. Based on availability, cost and maximum distance limitations, we have focused our recommendation to two cable types:

- Generic NEMA level 4 cable, 22 AWG (0.65 mm)\*
- Belden 8471, 16 AWG (1.3 mm) cable (or equivalent)

**NOTE:** Level 4 cable specified by Echelon as originally defined by the NEMA differs from the Category 4 specification proposed by the Electronic Industries Association/Telecommunication Industry Association (EIA/TIA).

The cables Phoenix Controls recommends are stranded, two-conductor, twisted-pair (TP) without a shield. A shield, or drain wire, is not required for Celeris controller communications wiring and should not be used. Both of these cables are available from multiple sources either solid or stranded, in plenum and non-plenum rated versions.

- If two conductors are to be placed in a terminal opening, twist the bare conductors prior to inserting these in the terminal opening.
- If a wall-mounted sensor with a communications jack is used, the connections to the jack must be treated as either a bus connection or an EOL connection.
- While the room-level communications wiring is not polarity sensitive, it is recommended that a consistent color-coding and polarity convention be followed.
- Each terminal on the terminal block will accommodate up to two 16 AWG (1.3 mm) stranded conductors.
- Communications connections are to be made following a bus or daisy chain topology.
- Two end-of-line (EOL) terminators must be installed, one at each end of the room-level network.

### Maximum Cable Lengths

- When using Level 4 cable operating in a bus topology, the maximum cable length is 4500 feet (1370 meters).
- When using 16 AWG cable operating in a bus topology, the maximum cable length is 8800 feet (2680 meters).

### Phoenix Controls Wiring Recommendations

- Use cables recommended by Phoenix Controls.
- Stranded wire is strongly recommended for ease of installation.
- Follow good wiring practices:
  - Do not run the communications cable in the same conduit or wire way as the power cables.
  - If the communications cables must cross power cables, it is best to do so at a 90-degree angle.
  - Shield or drain wires, if present, should be wrapped with insulating tape to prevent contact with exposed conductors or contacts.
  - Maintain a consistent color code or polarity all the way through the wiring system.
  - All connections must meet the requirements of an NEC Class 2 circuit.
- Local and national electrical codes take precedence.
- **Consult the project specific wiring diagrams for exact details.**

## TRANSFORMERS

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The Celeris valve controller requires the use of a step-down transformer (either 120/24 volt or 240/24 volt). Any transformer used to power Celeris valve controllers must meet the requirements of an NEC Class 2 circuit.

- The secondary transformer must be limited to a maximum of 30 Vac.
- Secondary power shall be current limited with either internal circuit breaker protection or with a four-amps slow-blow fuse, in accordance with NEC Class 2 power requirements.

Phoenix Controls offers the following recommendations; however, designers, installers and owners should always consult their national and local electrical codes before selecting transformers for their systems.

- Transformers should not exceed 100 VA. Use multiple transformers, rather than larger transformers, when more than 100 VA is required.
- Each pressurization zone should have either a dedicated single-phase primary circuit or a secondary circuit disconnect.
- If an earth ground is provided, it should not be connected to the Celeris valve controller, even though there is a three-terminal connector on the controller board.

**NOTE:** AC line voltage polarity must be maintained on all Celeris valve controllers and AC powered ancillary devices.

### Transformer Sizing

To size a transformer, all of the VA loads for the circuit must be totaled. This table outlines the power ratings of Celeris controllers with Accel<sup>®</sup> II valves, and related third-party purchased equipment. Use these values to size the power transformers.

Celeris Valve Controller		
Control type L (low-speed electric)	Single/dual valve body	10 VA
Control type M (high-speed electric)	Single/dual valve body	70 VA
Control type N (pneumatic)	Single/dual valve body	10 VA
External Devices		
Router/repeater modules		2 VA
Sensor	Approved thermistor	0 VA
Heating valve	Belimo LM24 (2-state)	3 VA
Heating valve	Belimo LM24SR (propor)	4 VA
Each 4-20 mA device	Example: transducers	0.5 VA